

Helping children with words in word problems

Word problems! The mere mention of them strikes a chord of dread and loathing in the hearts of many adults — including a sizable number of elementary school teachers. We remember our struggles with “If one train is travelling 50 miles an hour in this direction and another train is...” all the time wondering when we were ever going to use this information, anyway.

However, the events of daily life are filled with the need for problem solving. These problems do not come pre-packaged in ready-made algorithms (e.g., $7 \times 42 = ?$). They are often embedded in details from which we must sift out the information we need to answer our questions. Frequently the questions themselves are elusive; we spend much of our time in real-life problem solving trying to figure out exactly what it is we need to know. Thus, we encounter real problems that must be described with words and numbers — i.e., word problems — and we must structure them and make meaning for ourselves.

For students of mathematics, particularly the children we teach in elementary school, word problems can serve as a context in which to learn mathematics concepts (e.g., Carpenter, Fennema, Franke, Levi & Empson, 1999). Experiences with word problems can provide a meaningful bridge for connecting classroom mathematics with real-world mathematics. Children’s prior experiences with solving real problems in their everyday lives (for example, How might I share a



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from the USA,
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brownie equally?) can inform their problem solving in the classroom.

Much has been done in research and curriculum development to promote children's success with problem solving. Important principles can be drawn from research (e.g., Carpenter et al., 1999; Fuson, Carroll & Landis, 1996) on the order of difficulty of the mathematics as well as how students build on their informal mathematical knowledge in the context of word problems. Several curricula have attended to these research findings. When word problems are carefully selected and sequenced for the mathematics they embody, they need not be the nemesis they once were. This article will focus on the potential barrier to success that students may encounter because of the words, and subsequent contexts, in which the mathematics is embedded.

Words in word problems

The research available indicates that interference with comprehension of word problems may be caused, at least in part, by a problem with the words and contexts, a "word" problem, if you will! For students who speak English as a second language, this problem is typically exacerbated (Stoller & Grabe, 1993). In contrast, appropriately chosen words and contexts can provide access to the mathematics involved. When word choice is carefully considered, and when word problems reflect children's

experiential backgrounds and interests, vocabulary difficulties are minimised.

Below are eight practical ways in which teachers can reduce the difficulties students encounter with words and contexts.

1. Remember the importance of teaching vocabulary in each mathematics lesson. Carefully teach unknown words and concepts just as you would in a literacy lesson.
2. To allow your students the time needed to explore the mathematics presented and come up with alternate solutions, assign only a few well-chosen problems. Oftentimes, two or three problems can provide sufficient contexts for focusing on the mathematical ideas at the heart of the lesson.
3. Adapt the word problems provided in your curriculum materials. Use the names of people, places, and activities that are familiar to your students.
4. Develop word problems (and encourage your students do so as well) about a book you have read to the class, using characters, settings, and situations introduced in the selection. For example:

Little Red Riding Hood walked happily through the woods. In her basket she carried three sugar cookies and two chocolate chip cookies for her grandmother. How many cookies did she have?

5. Use enough words to provide a meaningful context. A short word problem is not necessarily easier; rather, sufficient context needs to be provided for students to be able to "see" the problem mentally.
6. Develop word problems from content area reading selections, e.g., a word problem following a reading in a health text:

The normal temperature for most healthy people is 98.6° Fahrenheit. Josie has a sore throat and a fever. Her temperature is 102.7° Fahrenheit. How many degrees above normal is Josie's temperature?

7. Develop word problems from students' real-life experiences. For example, use the local holiday parade as the theme for a set of word problems:

Many people sat in the brightly decorated stands to watch the Independence Day parade. The red section seated 500 people, the white section seated 400 people, and the blue section seated 450 people. How many people could sit in the stands?

8. Encourage children to write their own word problems or to rewrite textbook problems to reflect their interests and experiences. A problem written by 6-year-old Shawn:

I don't got 2 dogs.
I don't got 3 cats.
How many did I don't got?

Word problems need not be a source of frustration for your students. A well-developed mathematics curriculum can help you provide students with the support they need to be successful with word problems. However, you as a classroom teacher know your students best, and you know the words and contexts that are likely to provide difficulty for them. The eight ideas in this article are provided to help you reduce the problems caused by words in word problems, thus enabling your students to direct their energies to the mathematical reasoning needed for solving problems successfully.

References

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